

**ACCUCRAFT UK LTD**  
**Unit 4, Long Meadow Industrial Estate,**  
**Pontilas, Herefordshire. HR2 0UA.**

**Tel: 01981 241380**  
**www.accucraft.uk.com**

## **OPERATING INSTRUCTIONS**

### **KERR STUART 'WREN' 0-4-0ST**

#### **SAFETY FIRST**

All our locomotives are safe to run, and will give many hours of pleasure, providing the following safety procedures are followed: -

1. Please read the instructions thoroughly before running for the first time.
2. Always do a complete refill of gas, oil and water. Never refill just the gas to prolong the run.
3. Never let the engine run out of water.
4. When refilling the gas, do not have any naked flame present, and **NO SMOKING!**
5. Do not pick up the engine by the bodywork, chimney or boiler, especially when hot.
6. Only pick up the engine by the buffer beams and, when hot, use old gloves or a cloth.
7. Do not stand over the chimney. Ejected boiling water or steam may cause serious injury.
8. Do not open the smoke box door while the engine is alight.

## General Hints

As with all operating machinery, whether model or full size, wear will occur. In the model steam locomotive much can be done to help prolong its life and decrease the amount of time required in the workshop for servicing.

Keep the engine as clean as possible, and the motion free from dirt and garden debris. The valve gear, axles and crank pins should be oiled sparingly with light oil, e.g. "3-in-1 Oil". Over-oiling attracts dirt and grit, which will increase wear.

Regularly check that all screws and motion bolts are firm. Do not over-tighten, as this strips threads and shears bolts. **When filling the lubricator, always use a high temperature steam oil such as 460; this is available from other retailers. FAILURE TO USE THE CORRECT GRADE OF OIL CAN LEAD TO BLOCKED STEAM PIPES AND WILL INVALIDATE THE GUARANTEE.**

When running your engine avoid excessive speed and acceleration, both will cause premature wear in the valve gear. Prototypically, narrow gauge locomotives ran at a speed of between 10 and 20 m.p.h., and never exceeded 25 m.p.h.

## Positions of Fillers and Drains etc.

*The gas tank* is under the cab footplate, and the gas tank filler valve is at the top of the gas tank turret, set at an angle to the rear of the cab. The gas control valve replicated the locomotive's brake lever and can be operated from the back of the cab. Owing to the small space available for the gas tank it may be best to fire the locomotive up and raise the pressure to an operating level before extinguishing the fire to re-gas the tank – the gas should then last for the full duration of a run.

*The lubricator* is under the running plate in front of the smokebox, accessed by unscrewing the cap with a screwdriver. The lubricator drain is underneath the footplate just ahead of the offside cylinder. To drain, un-screw the drain pipe cap.

*The boiler water filler* is hidden under the tank filler in the middle of the saddle tank. Lift the dummy cap off and undo the knurled cap with a screwdriver to fill with water. This may be replaced with a Goodall valve to facilitate topping the boiler up while the locomotive is in steam.

*The boiler/water gauge drain valve* is located under the nearside bunker, turn clockwise to open, anti-clockwise to close. The drain is best left open between runs and can be used to clear bubbles from the glass.

*The safety valve* is found in the steam dome. To access it use a fine pair of tweezers inserted in the vent holes and unscrew the top of the dome. The valve can be adjusted by turning it down clockwise to increase the pressure, anti-clockwise to reduce it – the valve has been factory set at 60psi.

*The main steam regulator valve* is the lever projecting towards the back of the cab from the steam turret.

*The direction control* is the lever in the offside of the cab. To operate pull gently outwards and move to the desired direction. The control is “gated” and will therefore hold itself in the full forward or reverse position.

### **Preparation for Running**

Always service in the following order; first gas, oil then water.

*To fill the gas tank:* invert the gas can and apply the nipple to the gas inlet valve on the top of the tank turret. It is advisable to support the loco under the gas tank whilst filling, to prevent the

engine tipping over. You will know when the tank is full; gas will blow back from the inlet valve in a strong jet. A small amount of gas and air will escape during filling, but the difference between this and when the tank is full is always clear. You may find this easier with a long-necked gas adapter.

***Filling the lubricator:*** as you will read in the instructions for the end of the run, the lubricator should be empty of oil and water. To replenish this, remove the lubricator filler cap. Fill up the lubricator with steam oil to about  $\frac{1}{4}$  of an inch below the top. Leave the filler cap off for the present, so that any trapped air can escape. It can be refitted after you have filled up the boiler.

***To fill the boiler:*** remove the dummy tank filler cap and then the filler cap. The boiler is fitted with a water sight glass. Fill up the boiler so it is about  $\frac{3}{4}$  full. Replace the boiler filler cap, check that the lubricator does not need topping up, and then replace its filler cap also. Filler caps should be firm finger tight. They are sealed with a trapped 'O' ring and, therefore should not be over-tightened.

## **Lighting Up**

Open the smoke box door; just pull it open by the door handle. Light your lighter/match etc. and gently open the gas control valve until a gentle hiss is heard in the burner. Apply your light into the smoke box and the flame should 'pop' down the fire tube and ignite the burner inside the fire tube.

If the gas valve is opened too much the flame will not pop back; it will either fail to ignite, will roar in flame out of the smoke box, or there will be a ball of flame around the front of the engine, which will then blow the whole fire out (after giving the driver a fright)! When the fire sound has stabilised, after about 30 seconds the gas can be turned up until a healthy roar is heard. The smoke box door may be shut after about two minutes. Now leave the locomotive to raise steam.

## Running

When the engine has raised about 40 psi, you are ready to start running. It is advisable to run the engine in reverse first; it clears the condensed water from the cylinders best this way. Before commencing your first run of the day, it is advisable to put a cloth loosely over the chimney for a few minutes, as condensed water will be ejected from the chimney. This is quite normal; the motion of the engine will be jerky until all condensate has been ejected. **DO NOT stand over the chimney as ejected boiling water/steam could cause serious scalding.**

Place the direction lever into the reverse position, and then open the main steam valve. The engine should start to move off in the reverse direction. When starting from cold it will be jerky, this is normal as it must clear the condensate from the system. The more the main steam valve is opened, the faster the engine will go; our advice is to start slowly and learn the road with your engine.

After a minute or so, remove the cloth and continue running. In running it is correct practice to balance the boiler pressure against the load being pulled and the track conditions. With a light load and level track the pressure may need to be only 25-30 p.s.i. therefore, turn the gas control down to keep this pressure. When running a heavy train with steep gradients, increase the pressure by turning up the gas. The ideal running pressure can be learnt by experience and is one of the pleasures of running a live steam engine. There is no need to have the safety valve constantly blowing off (it is what its name implies – a safety vent for excess steam pressure). When the gas runs out a complete gas, oil and water service must be done (remember GOW, also remember to shut the gas regulator before refilling, and **DO NOT** refill with gas near any other live steam loco). When the locomotive slows as the pressure falls at the end of a run, stop the engine. Open the lubricator valve and blow out any condensed water. If you intend to continue running, close the drain when you see oil coming out

of it and carry out a general refill. If it is the last run of the day, leave the lubricator drain cap loose.

### **End of Run**

As previously mentioned, the locomotive will slow (due to pressure dropping) when the fire has gone out, stop at a convenient place and open the lubricator drain valve. Blow out all condensed water and the remaining oil. Leave the boiler valve open and allow all the remaining steam to blow out. The locomotive should be allowed to cool. When cool, clean the engine, check the motion and oil if necessary. The locomotive should always be put away in a clean condition as it attracts less dust and is always ready for the next run (or to be shown to an admiring friend). Always leave the lubricator drain valve and the boiler drain valve open so that the boiler will not be strained if subject to any temperature change. It is advisable to store the locomotive where any residual drips of oil or water do not matter.

### **Blocked Gas Jets**

If the gas jet becomes blocked with particles of dirt within the gas, the jet will have to be removed and cleaned. With a spanner or pliers carefully undo the pipe union on the gas control valve. Remove the pipe and jet holder assembly from the burner. Holding the jet holder gently in a vice, unscrew the jet. To clear, place the jet nozzle against the inverted gas can nozzle and clear the jet with a blast of gas. Under no circumstances use a pricker wire, this will damage the jet hole. Replace the jet in the holder, ideally using a thread sealant sparingly on the threads. Ensure it is tightened up firmly. Replace the assembly into the burner and re-connect the pipe to the control valve. Ensure this is done up tightly, test **CAREFULLY** with a flame and the gas “just on”, for gas leaks. Tighten if required.

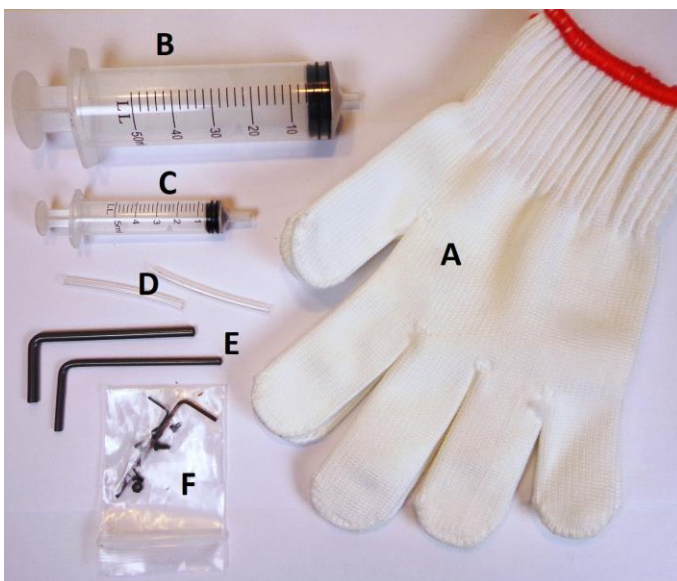
*HAPPY STEAMING!*

## Identification of Controls and Fillers



- |                          |                            |
|--------------------------|----------------------------|
| 1. Steam regulator       | 6. Gas tank filler valve   |
| 2. Reverse lever         | 7. Burner air control ring |
| 3. Gas regulator         | 8. Water gauge             |
| 4. Lubricator filler cap | 9. Pressure gauge          |
| 5. Boiler water filler   |                            |

## Identification of Accessories



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| A. Protective gloves                                       |
| B. Boiler filling syringe                                  |
| C. Small syringe   |
| D. Syringe extension tubes                                 |
| E. Hex nut spinners for<br>2mm and 3mm hex bolts           |
| F. Allen keys, 0.8mm for<br>cranks and 1.5mm for<br>wheels |

## A Bit of History

Kerr Stuart produced 163 'Wren' type locomotives before they ceased trading in 1930 and a further four were constructed thereafter by Hunslets. The 'Wrens' owe their origin to the 'Buya' class of 1903 although the type encompassed a huge number of variations including inside and outside frames and inside and outside valve gear. Our model is based on the 2' gauge 'new type' developed in 1915 with inside frames, Hackworth valve gear and cast-iron wheels fitted with steel tyres. In due course 'Wrens' were sent around the world, many to Africa and Asia whilst in the UK they found homes with construction companies and the Ministry of Munitions, some being used by the Ministry of Defence in the building of airfields. No fewer than 27 were purchased by R.H.Neal & Co. for sewer contracts and several of these were sold on to Devon County Council for road construction. A few 'early' type 'Wrens' survive around the world and half a dozen 'late types' have been preserved, five of them in the UK.





## **HINTS ON GAS FIRING CONTROL**

**CONTROLLING THE GAS FIRING OF YOUR LOCO MUST BE DONE WITH CARE AND ATTENTION. TURNING THE FIRE UP TOO MUCH CAN CAUSE GREAT DAMAGE TO YOUR MODEL SUCH AS BURNING OFF THE PAINT, MELTING THE INSULATION OFF THE WHEELS, AND CARBONIZING THE STEAM OIL IN THE SUPERHEATER WHICH BLOCKS IT. NONE OF THE ABOVE DAMAGE WILL BE COVERED BY WARRANTY AS IT IS ATTRIBUTED TO OPERATOR ERROR.**

**AT ACCUCRAFT WE GIVE YOU THE ABILITY TO RAISE A GOOD HEAD OF STEAM BUT IT IS UP TO THE OPERATOR TO CONTROL THE GAS FLOW SO THE FIRE DOES NOT ROAR OUT OF CONTROL AND BURN IN THE SMOKE BOX. IT IS VERY MUCH LIKE THE ACCELERATOR OF YOUR CAR, HOW YOU USE IT IS UP TO THE USER, DRIVE SENSIBLY AND YOU WILL NOT HAVE AN ACCIDENT; PUT YOUR FOOT DOWN AND YOU WILL PROBABLY END UP IN THE HEDGE. HARDLY THE CAR OR THE MANUFACTURER'S FAULT!**

**NEVER LEAVE THE LOCO UNATTENDED WHEN RAISING PRESSURE, AS THE HEAT INCREASES THE PRESSURE IN THE GAS TANK ALSO RISES AND YOU WILL HAVE TO TURN THE GAS DOWN. IF THE GAS CONTROL VALVE SPINDLE IS A BIT STICKY IT COULD NEED LUBRICATION WITH STEAM OIL. WHEN YOU UNSCREW THE NEEDLE VALVE TO OIL IT ALWAYS DO IT WHEN THE GAS TANK IS EMPTY.**

## **KEEP LOCOMOTIVE ORIGINAL PACKAGING**

**WE WISH TO ADVISE YOU THAT IT IS IMPERATIVE THAT ALL ORIGINAL LOCOMOTIVE PACKAGING, BOTH OUTER AND INNER BOXES AND ANY OTHER TYPES SUCH AS SHAPED POLYSTYRENE, SHOULD BE RETAINED.**

**SHOULD YOU NEED TO RETURN YOUR MODEL FOR ANY REASON, EITHER FOR SERVICE OR WARRANTY WORK, IT MUST BE SECURELY PACKED IN ITS ORIGINAL PACKAGING SO AS TO PREVENT DAMAGE IN TRANSIT.**

**IF THE MODEL IS PACKED IN ANY OTHER WAY WE CANNOT BE HELD LIABLE FOR ANY DAMAGE CAUSED BY IMPROPER PACKING. ALL ITEMS COVERED BY OUR TWO-YEAR WARRANTY WILL BE COVERED BUT ANY PARTS AND LABOUR ATTRIBUTED TO RECTIFYING DAMAGE CAUSED BY IMPROPER PACKING WILL BE CHARGED FOR.**

## GUARANTEE

Accucraft UK Ltd will remedy any defect or malfunction occurring with this product during a two-year guarantee period from date of purchase. This guarantee does not extend to malfunctions or defects caused by damage or unreasonable use, including the failure to provide the correct types of lubrication and water or by not controlling the gas correctly.

If a claim is to be made within the two-year guarantee period, in the first instance, return both the product and guarantee card to your dealer. In the event of your problem not being able to be fixed by your dealer, he will contact us for advice. If necessary, we will arrange for the product to be returned to our service department for repair.

This guarantee is quoted in addition to all legal rights of the purchaser under the Sale of Goods Act and shall expire two years from the date of purchase. Under no circumstances shall Accucraft UK Ltd be responsible for any consequential damages arising regarding any Accucraft UK Ltd product.

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## CARE OF YOUR LOCOMOTIVE

- Proper lubrication is most important but must not be overdone.
- Care should be taken when removing the loco from its packaging, as any levering action using projecting parts (e.g. buffers) may result in damage.
- Check with your dealer that these locomotives wheel standards are compatible with your track system. Ensure that your track is in good condition and well maintained.
- Keep the engine free of dust and dirt. Debris such as earth and gravel in the motion will lead to premature wear and failure.
- Always use steam oil in the lubricator, never ordinary household oil.
- Never light the burner without water in the boiler.
- Always control the gas correctly and do not have the fire too high so it goes into the smoke box and damages materials, paint, or wheel insulation.

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## SAFETY

- Always use this product in a well-ventilated area. Never get directly above the chimney, boiling water can sometimes be ejected from it.
- When in steam, and for some time afterwards the engine will be very hot. **HANDLE WITH CARE.**
- This model has many small parts and should be handled with care. It is not suitable for children under the age of 14 years old.

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## LOCOMOTIVE LOG BOOK

Loco Serial No: ..... Boiler Serial No: .....

Gas Tank Serial No: .....

First Registered Owner: .....

Date Purchased: .....

Second Registered Owner: .....

Date Purchased: .....